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Smart as Democratically Transformative? An Analysis of 'Smart City' Sociotechnical Imaginary in India

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Abstract

'Smart cities' as sociotechnical imaginaries have been enthusiastically embraced by urban planners and policymakers around the world. In 2014, the government of India launched its Smart Cities Mission ostensibly to create socially inclusive and sustainable cities. Aspiring to make their cities smart, and following guidelines provided by the national government, urban authorities from all corners of India submitted proposals to compete in a Smart City Challenge. If successful, they would receive financial and technical support from the national government, to carry out the proposed smart transformations. Focussing on the urban mobility aspects of one such proposal, submitted by New Town, Kolkata, we assess how democratically transformative was the collective process of imagining smart cities in India. A democratically transformative process not only imagines the benefits of smart transformations to be widely distributed across different sections of the city, but it is also participatory and articulated. A participatory process affords possibilities to the most marginalised citizens to engage and raise their diverging and dissenting voices. And an articulated process registers the voices of the most marginalised in the sociotechnical imaginary it produces. Our results indicate that while considerable efforts were made to engage with citizens in the making of the imaginary, the process remained highly uneven and technology-centric, shaped by 'globalised' aspirations of urban smartness and by the upper and middle classes, leaving behind the voices and needs of poor and marginalised citizens of Kolkata.

Keywords: Smart city, transformation, sociotechnical imaginary, participatory policy, India

Acronyms

HIDCO	Housing Infrastructure Development Corporation, India
ICT	Information and Communications Technology
IT	Information Technology
MOHUA	Ministry of Housing and Urban Affairs, India
MoUD	Ministry of Urban Development, India
NKDA	New Town Kolkata Development Authority
NRI	Non-resident Indian
NTK	New Town, Kolkata
SCP	Smart City Proposal

Figures and Tables

1 Introduction

The ‘smart city’ has been enthusiastically embraced by planners and policymakers around the world, promising everything from advanced technology to high standards of living for citizens. The smart city has also been criticised as technocratic, and for extending control by large multinational corporations (Sadowski and Pasquale 2015; Hollands 2015). These criticisms, however, seem to have had little influence in government circles, where the policy enthusiasm for smart cities remains fervent. In India, for instance, this smart city enthusiasm has continued unabated since 2014, when the national government launched its Smart Cities Mission aiming to create ‘socially inclusive local development’ and ‘environmentally sustainable’ cities, through a considerable emphasis on technology-led smart ‘solutions’, using the slogan of ‘Transform-Nation’ (MoUD 2015). Aspiring cities submitted proposals to compete in a Smart City Challenge, for receiving financial and technical support from the national government. In this paper, we conduct a critical analysis of one such proposal, submitted by New Town, Kolkata (NTK).

As promises of social inclusion with technoscientific solutions, smart city visions are usefully approached as sociotechnical imaginaries (Jasanoff and Kim 2009), in order to highlight the direct implication of visions in actual transformation of sociomaterial realities and the constitutive role played by modern science and technology in human imagination and sociopolitical orders. Yet, imaginaries can only guide transformations of reality, rather than determining them. Moreover, imagination is not just the preserve of a few policymakers and politicians advised by technoscientific experts, but rather distributed widely among a nation’s citizens. In fact, without the citizens’ collective imagination and ‘willingness to invest in their own dreams of shared identity’, a ‘state may be, or may become, little more than an empty shell, though possibly one with brutal and oppressive instruments at its command’ (Jasanoff 2004: 25-6). In a nation or a region, citizens' imaginings can be diverse, based on contrasting expectations of the future. These imaginings might be in tension, competition, or even in conflict with each other, which in turn gives rise to the ‘politics of imagining'. In such politics, powerful actors may attempt to push forward their visions over those of marginalised actors. As state authorities promote some of these visions, translating them into sociotechnical imaginaries for (national) development and progress, the resulting imaginaries work as ‘active exercises of power in selection of development priorities, allocation of funds, and most importantly acceptance and suppression of political dissent’ (Jasanoff and Kim 2009: 123). Overall, sociotechnical imaginaries may be defined as ‘collectively held, institutionally stabilised and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order, attainable through, and supportive of, advances in science and technology’ (Jasanoff and Kim 2015: 4).

We analyse the sociotechnical imaginaries of the smart city as represented by the New Town, Kolkata proposal and the Indian national Smart Cities Mission. We ask if NTK’s smart city imaginary can be considered democratically transformative. The latter has three aspects. First, a democratically transformative sociotechnical imaginary is distributed, in that its envisioned benefits are available to all citizens, irrespective of the social groups they belong to. Second, a transformative imaginary is participatory, if the most marginalised citizens are

afforded possibilities to raise their divergent and dissenting voices in its making. Third, a transformative imaginary is articulated, if it registers the voices of the most marginalised. To conduct this analysis, we focus on one sociotechnical system, namely urban mobility, which is central to smart city discourses (Khanna and Khanna 2015: 40).

We aim to make two contributions. First, we develop a novel conceptual framework to rethink smart city discourses, by analysing how distributed, participatory and articulated is Kolkata's sociotechnical imaginary. Second, we aim to uncover the democratic politics of developing smart city sociotechnical imaginaries. This is particularly interesting in the context of the Smart Cities Mission and Smart City Challenge in India because of the government's unambiguous promotion of citizen participation and social inclusion in smart city planning. By analysing how participation and inclusion are performed in Kolkata, we offer neither an enthusiasm for the democratising smart city nor a critique of its inherent technocracy. Instead, we examine the actual processes through which democratisation of the smart city imaginaries was attempted and ask how (partially) transformative were those processes. The paper is structured as follows. In Section 2, we review the literature on the politics of smart city designs. In Section 3, we outline concepts for rethinking smartness as democratically transformative. Our methodology of case selection, data collection and discourse analysis is described in Section 4. Section 5 presents our analysis of the NTK proposal in relation to the national mission guidelines. We summarise to draw conclusions in Section 6 and propose some directions for future research.

2 Literature Review

Smart cities signify a 'digital turn in urban governance', underpinned by a focus on speed and efficiency (Wiig and Wyly 2016: 487). The general goal is to 'optimise' cities using digital technology, which has been criticised as inherently technocratic (Muggah 2014). With digitisation as the central theme of smart cities, critics argue that information and communications technology (ICT) firms, computer programmers and management consultants can easily dominate the process and outcomes of such urbanism (Wiig and Wyly 2016: 489; Ponting 2013). These issues are highlighted not just for smart city visions in the Global North, which have been extensively studied (Caragliu *et al.* 2011; Capdevila and Zarlenga 2015), but also in the Global South, where smart city proponents present digital technology as the basis for benchmarking a city against the best cities around the world (Praharaj *et al.* 2018; Menon 2015).

Smart city visions emphasise the benefits of digitisation in multiple sociotechnical systems including electricity, mobility, water and sanitation (Nam and Pardo 2011; Falconer and Mitchell 2012; Carvalho 2014). Neirotti *et al.* (2014) identify mobility as a crucial 'application domain' which is being targeted by aspiring smart cities around the world. The professed aim is to mitigate pollution and congestion in urban areas witnessing fast economic development (Neirotti *et al.* 2014: 30). Smart mobility is framed to include local and international accessibility through transport infrastructure and services, green, non-motorised and shared mobility options based on 'sustainable, innovative and safe transport system[s]' and the 'availability of ICT infrastructure' (Giffinger and Gudrun 2010: 15; Irungbam 2016: 172; van der Graaf and Ballon 2018). Much of the latter relies on big data, meant to enable 'real-time

tracking and monitoring' of public transport facilities as well as transactions through smart cards and mobile phones (Kitchin 2014). In such settings, citizens are merely 'data-providers' (Calzada 2018), whose mobility behaviour is expected to feed into transport planning by the governments. Such data-centric mobility services are often criticised for shifting the focus away from ordinary people's mobility needs, experiences, livelihoods and well-being, by framing data as 'the most powerful and driver of progress towards sustainability' (Martin *et al.* 2018; Trencher 2018: 3; Hollands 2008). Docherty *et al.* (2017) argue that smart mobility is a governance challenge, instead of a technology-adoption one, in which better quality of life and inclusion of citizens in new mobility planning is based on peer-to-peer sharing, automation and application of the Internet of Things.

The general promotion of new technology as part of smart city visions is tied to an optimism about urban futures facilitated by investments in human capital (Caragliu *et al.* 2011; Neirotti *et al.* 2014), with the stated aim of delivering a 'smart combination of endowments and activities of self-decisive, independent and aware citizens' (Lazaroiu and Roscia 2012: 328). Yet, critics argue that priority setting for smart city initiatives is often dominated by city government officials, tech companies and growth coalitions (Luque *et al.* 2014). And implementation may be organised through public-private partnerships dominated by municipal governments and technology firms charging for service provision (Midgley 2009). The smart city imaginaries in such cases are considered technocratic, rather than being representative of citizens' diverse imaginings of urban futures. To address this lack of representation, many city and national governments have now adopted the rhetoric of citizen participation in designing smart city visions and plans (Kruks-Wisner 2018; Bertorelli *et al.* 2017; Cardullo and Kitchin 2017). We analyse one such vision in this paper.

In addition, many studies show how smart cities exclusively target specific groups of people (middle- and higher-income citizens), leaving behind and ignoring the needs of poor and marginalised citizens (Bhatkal *et al.* 2015; Datta 2015; Watson 2014; Vanolo 2013). Similarly, Benedikt (2016: 25) argues that smart cities are not designed to accommodate people who are 'uneducated in technology, poor or otherwise marginalised'. The latter people are framed as '"non-forward-thinking" or in other words, non-valuable individuals' (Benedikt 2016: 25). To tackle these problems of social exclusion and digital technocracy underpinning smart city imaginaries, some scholars have called for a reorientation from technologies to people (Nam and Pardo 2011; Vanolo 2013; Capdevila and Zarlenga 2015). Proposals are afoot for 'people-centred smart cities' which aim to harness the 'collective intelligence' of citizens' voices and skills (Trencher 2018; Saunders and Baeck 2015: 8, 44). Kundu (2016: 100) argues that 'through their individual actions and collective practices, people are central to the processes of place-making as they constantly reconfigure landscapes, things and possibilities'. Such agency of people, scholars argue, needs to be recognised and nurtured by broadening the range of actors setting the agenda and driving the implementation of smart cities (Bakıcı *et al.* 2013). Participatory governance is proposed as a key transformative element on a smart city imaginary (Corsini *et al.* 2018), which entails 'inclusive human resource management and transparent governance' (Irungbam 2016: 164, 167). Smart urbanism would then be able to connect the life on the streets with that in boardrooms and city halls (Townsend 2013), facilitating transparency, collaboration and social learning through information sharing (see also, Luque *et al.* 2014; Ferro *et al.* 2013).

The preceding discussion raises the question: which participatory governance mechanisms allow smart city developers to work proactively with marginalised citizens (and empower community initiatives), rather than simply catering to powerful business interests (Capdevila and Zarlenga 2015)? In what ways can such participatory decision-making be achieved and the stated benefits of smart city developments be distributed among the most marginalised citizens? If smart cities are rethought as 'democratic ecologies' (Araya 2015: 13), would it expand possibilities for empowerment and bottom-up civic engagement, enabling citizens to 'co-produce public systems of governance'?

Emphasising the importance of participation in technoscientific developments such as smart cities, Jasanoff and Kim (2015: 97) argue for 'grassroots participation', within which 'local people need to be listened to, not just "consulted" or "educated"' (Jasanoff and Kim 2015: 97). Empowering engagement with citizens can take the form of delegating decision-making power to citizens (Arnstein 1969), and letting citizens shape the directions of smart city development (Paquet *et al.* 2016). To enable the citizen-led transformations, the forums and techniques of participation have to be sensitive and symmetrical towards diverse interests and understandings (Stirling *et al.* 2007), helping to enlarge the space for voices of the most marginalised. Examples of participatory forums include citizens' juries (Pimbert and Wakeford 2002), hybrid forums (Callon *et al.* 2009), open space technology (Owen 2008), and deliberative mapping (Davies 2006). Participatory forums differ in the extent to which they address relations of power between actors in positions of cognitive or political authority and those occupying more marginalised positions. They also differ in terms of taking a diversity of voices (knowledge and interests) into account, for making decisions, visions and policies (Stirling 2008). Truly transformative democracy requires that the voices of the most marginalised and dissenting citizens are taken into account (Martin *et al*. 2018; de Hoop and Arora 2017).

This begs questions such as: What avenues are offered to the marginalised sections of the city to raise their (dissenting and divergent) voices? What effects do their voices have on the (participatory) development of smart city imaginaries? How is knowledge from bottom-up citizens' initiatives linked to smart city developments led by government institutions, firms and non-governmental organisations?

3 Rethinking Smart as Democratically Transformative

To address the foregoing questions, adapting earlier work by one of us (Arora 2016), we aim to rethink 'smart' in cities. We propose that an urban sociotechnical imaginary is smart if it is: a) distributed, b) participatory, and c) articulated. Some of the key questions that emerge from rethinking smart in this way are outlined in Figure 1.

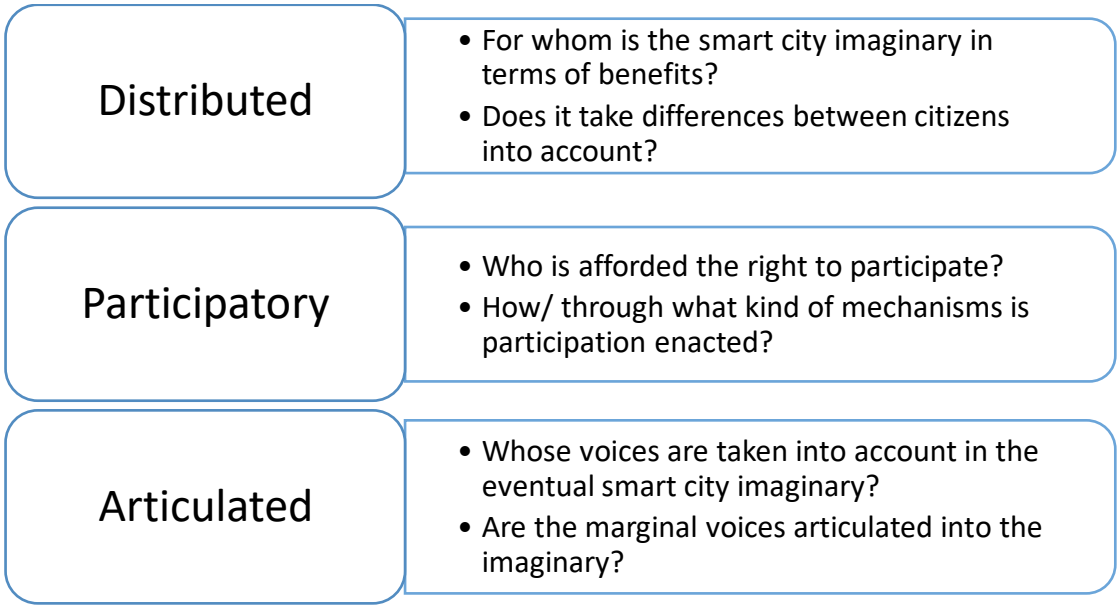
A smart city imaginary is *distributed* if it envisions its stated benefits to be available to all citizens, irrespective of their social group (concerning class, caste and gender). Here, we are building on theories of distributive justice of actions (in our case, the imagined smart city interventions), focussing on the distribution of well-being and capabilities (Vallentyne 2007). By asking whether a smart city imaginary is distributed, we aim to ascertain whose interests and needs the smart city is imagined to serve, and whose capabilities is it meant to nurture. In

unequal cities, differences between citizens will mean that the needs of the poor and marginalised are distinct from those of the middle and upper classes. For example, while the poor might need access to clean drinking water and safe cycling infrastructure, the middle and upper classes might demand faster internet connections and 14-lane expressways. So we ask if the smart city imaginary takes these differences into account.

A smart city imaginary is *participatory* if (in the process of its imagining) the most diverse set of citizens, particularly those who are marginalised, are afforded opportunities to raise their voices. By asking whether a smart city imaginary is participatory, we aim to map the forums and techniques used by smart city planners to elicit citizen participation (building on the overview of such participatory techniques presented in the previous section). We ask whether the citizen engagement methods used in Kolkata nevertheless ended up closing down the decision-making process by marginalising the messy diversity of voices and interests, with the aim of arriving at an authoritative and prescriptive proposal (Stirling 2008).

A smart city imaginary is *articulated* if citizens' voices, interests and knowledge, raised through participatory forums and techniques, are considered by policymakers and other actors with decision-making powers at the city and national levels. Asking whether a smart city imaginary is articulated, directs attention to the matches and mismatches between the expectations/ideas voiced by citizens and the smart solutions actually proposed by policymakers in the sociotechnical imaginary. The crucial consideration is not whether citizens' voices count or matter in constructing the smart city imaginary, but rather which voices matter and what importance is afforded to them in the imaginary. In particular, how are the (dissenting) voices of the least powerful taken into account by planners and policymakers (de Hoop and Arora 2017)?

Figure1: Questions Emerging Out of Rethinking Smart as Distributed, Participatory and Articulated



Overall, by asking whether a smart city imaginary is distributed, participatory and articulated, we aim to map if the decision-making process is democratically transformative by *opening up*

to include a wide diversity of voices and interests, including those of the most marginalised (Stirling 2008). And by doing this, is the imaginary able to consider and highlight neglected issues, which point to new directions for future sociotechnical developments in the city?

4 Documents and Interviews

In order to appreciate the smart city imaginaries produced at national and regional levels in India, we rely on the national *Smart Cities: Mission Statement and Guidelines* (MoUD 2015), or mission guidelines, and two versions of New Town, Kolkata's Smart city proposal submitted to the national Smart City Challenge (NKDA 2015a; NKDA 2016a). Each version of the proposal includes annexures containing minutes of official meetings, copies of memoranda of understanding between the New Town Kolkata Development Authority (NKDA) and other organisations, as well as details of citizen engagement processes during proposal development (NKDA 2015b; NKDA 2016b). We also take into account the feedback provided by the national government officials on the first version of NTK's proposal (MoUD 2016), responding to which NTK authorities prepared the second version and annexures.

We complement the document analysis with detailed semi-structured interviews conducted by the first author with policymakers and citizens, during two stretches of fieldwork in Kolkata in 2015 and 2016. Interviewees included a senior city government official who played a critical role in envisioning new directions of urban transformations; a senior urban planner who played a significant role in land use planning and design of the city before the inception of smart city plans; and a private consultant who worked closely with the government in drafting smart city plans. Also interviewed were three citizens who actively participated in developing the Smart City Proposals (SCPs), representing their residential communities. These interviews were audio-recorded. We also conducted short interviews with around 20 marginalised people including rickshaw pullers, autorickshaw drivers, roadside vendors, fruit and vegetable sellers, cleaners and construction workers, who offered insights into their everyday mobility as well as problems with the smart city visions at the time.

5 Analysis

NTK is located on the north-eastern fringe of the central district of Kolkata, India. It was primarily a rural area supporting agricultural and pastoral activities until a new township was planned in the early 1990s. The aim was to establish a modern business district, with some residential quarters, for a population of one million (NKDA 2016c). Private developers invested in the housing and commercial sectors, creating urban living space for 'global Indians' belonging to the (upper) middle classes living in Kolkata (Bose 2014: 392). Around 200 poor households were displaced from their (rural) lands to make way for the new town. According to official reports, they were offered 'a rehabilitation and resettlement package in accordance with norms of Government of India and State government' (HIDCO 1999: 8). The stated visions for the early development of NTK in the 1990s were modernity, functional efficiency, aesthetic attractiveness and environmental sustainability (HIDCO 1999). The

overarching ambition was to become a financial hub of West Bengal state and India (Hochadel 2016).

NTK covers an area of 35.5 sq. km (8777 acres). Kundu (2016: 93) describes the township to be comprised of residential 'gated' housing apartments overlooking agricultural lands adjoining the city. The surrounding rural communities act as 'service villages', supplying 'servants, housekeepers, drivers, cleaners, cooks' to the new residents of the housing complexes (Kundu 2016: 96). The focus on attracting information technology (IT) companies to set up offices in the city is evident in the land use changes in New Town between 1999 and 2006: the percentage of land available for IT, commercial and institutional purposes increased at the expense of residential and open spaces (see Figure 5.1). Area for transportation remained nearly the same over this period (Sengupta, 2013: 364).

The main administrative body organising local services and amenities is the New Town Kolkata Development Authority. The central planning agency for the overall development of the city is the Housing Infrastructure Development Corporation (HIDCO). The NKDA and HIDCO took the lead in preparing NTK's proposal for the national Smart City Challenge, taking into account inputs from firms such as IBM, SAP, Oracle, Wipro, Atos, Shapoorji Pallonji, Wabag and Intel (NKDA 2015a: 49). Future Cities Catapult, a UK-based consulting firm, assisted in citizen engagement initiatives.

NTK's proposal promises to get the city ready for economic and demographic growth, offering its citizens the 'best in class urban living experience' (NKDA 2015a: 16). Other promises include becoming a global services hub by attracting new IT companies, setting up hospitals and higher education institutes, as well as offering citizens opportunities for better work-life balance by hosting entertainment centres, parks and museums. The proposal also upholds the goals to be achieved by NTK, in line with the national mission guidelines. For instance, in the domain of mobility, NTK's proposal emphasises public transportation through metro rail, monorail, electric buses, e-rickshaws improved walkability and cycle lanes. In developing these elements of the proposal, representatives from West Bengal's state Transport Department were involved. Other strategies noted in the proposal include IT connectivity, e-governance and mechanisms for active citizen participation in future decision-making (NKDA 2015a: 16-7).

5.1 A 'Distributed' Smart City Imaginary?

The national Smart City Mission calls for development that is 'sustainable and inclusive', to improve quality of life, employment opportunities and incomes for everyone, but particularly 'the poor and the disadvantaged' (MOHUA 2017). By emphasising the flow of any smart city benefits to poor and marginalised people, the mission guidelines for proposal preparation clearly emphasise inclusion (MoUD 2015: 34). Yet, the guidelines also assume *citizens* to be a homogenous category by arguing that 'applying smart solutions in the transport sector (Intelligent traffic management system) and reducing average commute time or cost to citizens will have positive effects on productivity and quality of life of citizens' (MoUD 2015: 8). Here the 'smart' solutions are assumed to benefit all citizens' productivity and quality of life. Differences with respect to gender, caste, age, disability, income class (including ownership of a motorised or non-motorised vehicle) are not highlighted.

Smart mobility initiatives are imagined as ostensibly beneficial to everyone in the city, marginalising differences of gender, class, caste, age, location and disability. Even when differences are considered, NTK's proposal emphasises the definition of transport in a smart city to be 'plentiful and attractive to people of all income levels' (NKDA 2015b). This universal framing does not follow the national mission guidelines, which suggests the taking into account of the differences between 'children, women and elderly' (MoUD 2015: 9). The erasure of differences and inequalities from the proposal depoliticises NTK's smart city imaginary. By claiming universal benefits (for all residents of the city), the imaginary hides how smart city initiatives may only serve the interests of the few (belonging to the middle and upper classes) and not the interests of the many poor and marginalised. Through its smart city imaginary, NTK aspires to become a 'satellite city', a 'service hub' and a luxury home for middle- and high-income groups of IT and corporate professionals, while excluding a wide range of poorer people who are made almost invisible in the imaginary. Many people in NTK earn their living from driving rickshaws, vending fruits and vegetables from pushcarts, labouring on construction sites, working as security guards in flats and offices, and cleaning and cooking as domestic 'servants' in the middle- and upper-class homes. Some of these workers live in the city. Others commute from surrounding villages. Nearly all of them use public transport services, roads and other infrastructure on a daily basis. Does the New Town, Kolkata Smart City Proposal direct any attention to their specific needs?

NTK proposes to build a 'hawkers' corner' or a community marketplace, that allows small and marginal vendors 'to set up shop in an organised manner', instead of using pushcarts to sell at the buyers' doorstep (NKDA 2015a: 42, 43). Such initiatives are publicised as attempts to offer 'safe spaces' for these vendors, as part of the city's efforts to be 'inclusive' (following the national mission guidelines). However, New Town Kolkata Development Authority meetings held in February 2016 reveal an alternate (not-so-inclusive) logic behind this initiative. Responding to the 'increasing menace of encroachment of roadside public places by hawkers' who create 'nuisance by littering of waste in adjoining roads & footpaths and visual pollution' while 'also hampering free flow of traffic in service roads' (NKDA 2016b), the smart city aimed to seclude them in an enclosed 'hawkers' corner'. As noted by one of our citizen respondents, 'it was [considered] essential to remove them from eye-sight in order to present New Town as a clean and smart city'. In addition to displacing the small/marginal vendors from their current (mobile) locations, this smart city initiative also dissatisfied many middle-class residents for whom the designated 'corner' became a distant and inconvenient location to shop from.

Another purported pro-poor intervention is the proposed introduction of the *Toto* (a battery-operated rickshaw), ostensibly to create new employment opportunities in the smart city. By simplifying the bureaucratic process of acquiring a driving licence and vehicle registration, the government aims to encourage low-income individuals to own and drive a *Toto* (as a mode of shared/public transport) for a living. However, this 'inclusive' intervention at the same time extends the marketisation of public transport in NTK. A city official explicitly stated this during an interview:

> *I believe in market mechanisms. Market regulates the price and creates entry and exit barriers. Let us [government] not put additional barriers. If a poor person thinks he can make a living by driving a Toto vehicle, let him do that.*

> To facilitate this, by bringing the vehicle sellers (private companies) and buyers together, the NKDA even organised an 'E-rickshaw *Mela*' or festival. Here, it is apparent that when the NTK's smart city imaginary takes class differences into account and proposes 'pro-poor' initiatives, it is done within an overarching goal of promoting deregulation and marketisation (of public transport). Such an unregulated marketising approach, geared towards the privatisation of public services, not only overlooks inequality but can also end up worsening it (Datta 2015; Praharaj *et al*. 2018).

The same marketisation thrust is brought to the fore in the NTK imaginary's focus on cycling, which is presented as an essential element of the future smart city, while considering that it might not work for all citizens. As noted by a city official:

> *We are not advocating that everyone should start bicycling or people should bike to work … cycles will never be popular among elderly citizens, but we are not suggesting one size fits all strategy either. Citizens with different needs and choices will be able to choose what suits him/her most.*

The role of citizens as makers of choices emerges as a core tenet here, according to which, by the act of choosing, citizens become *consumers* of the smart city (Burri 2015: 244). Everyone is framed as possessing this ability to choose, to become a consumer, irrespective of the (relative) affordability or accessibility of the smart city interventions.

5.2 A 'Participatory' Smart City Imaginary?

The national mission guidelines emphasise citizen participation as crucial in the creation of smart cities. The guidelines refer to citizens as 'smart people' who participate in all phases of the making of the smart city, from its definition to 'implementing and designing post-project structures' (MoUD 2015: 18). The guidelines acknowledge that achieving such broad-based participation is a challenge. To overcome this challenge, the guidelines list ways to identify who needs to be involved on behalf of the 'smart citizens', how they should be consulted, and how their voices should be taken into account. The guidelines state:

> The proposal will be citizen-driven from the beginning, achieved through citizen consultations, including active participation of groups of people, such as Residents Welfare Associations, Taxpayers Associations, Senior citizens and Slum Dwellers Associations. During consultations, *issues, needs and priorities of citizens and groups of people will be identified and citizen-driven solutions generated*. (MoUD 2015: 22 emphasis added)

The guidelines also emphasise the importance of engaging with 'vulnerable sections of society (disabled, children, elderly etc.), ward committees and area sabhas (neighbourhood councils), important citizens groups (associations, organisations and institutions such as local chamber of commerce)' (MoUD 2015: 35). The suggested mechanisms through which these citizens were expected to be consulted, however, remained rather vague. And digital technologies as tools of citizen participation are emphasised. For example, the guidelines ask the question: '*how much* of social media, community, mobile governance have been used during citizen consultation?' (MoUD 2015: 35 emphasis added). The technological focus of the smart city imaginary is therefore maintained even in the envisioning of citizen participation by the national government, arguably to promote the contracting of private firms to design and

implement 'customised tools for tailor making stakeholders' engagements' (Corsini *et al.* 2018: 6) like technology-driven participatory forums and mechanisms.

In an attempt to adhere to the national mission guidelines, NTK's proposal focussed on providing numbers of people who 'participated' in defining the smart city, rather than focussing on assessing which (vulnerable) citizens were able to participate. The proposal states:

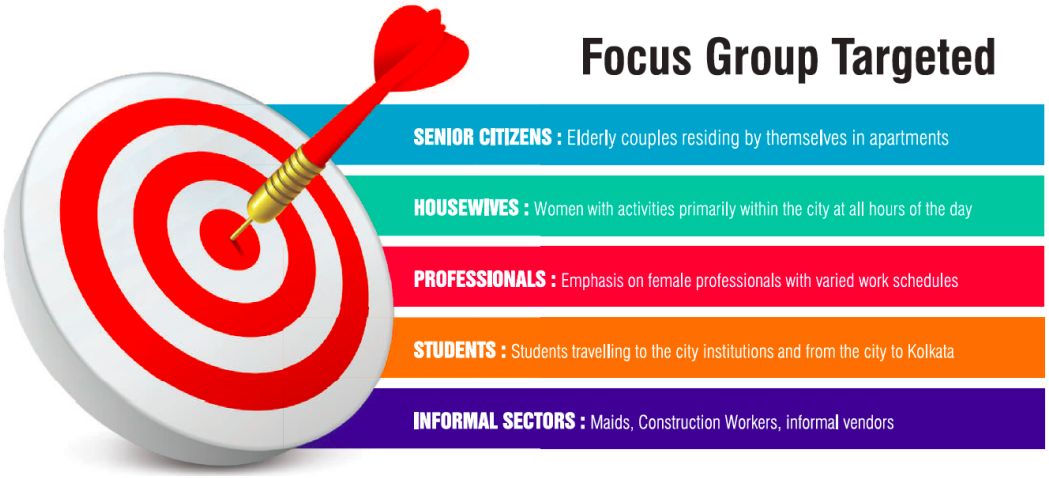
> *Leveraging a well-formulated 5 stage citizen communication strategy spread over 50 days, NKDA engaged with around 83% of the residing population (29880 residents) to obtain their feedback on city profile and understand their aspirations, visions and goals. Approximately 21% of respondents (7560 persons) provided inputs for formulating the Smart City Plan through 138 events. (NKDA 2016a: 19)*

The first version of the proposal included a single sentence on which citizens were involved: 'all groups of citizens were involved – senior citizens, housewives, students, professionals, housemaids, construction workers/workers in the informal sector, NRIs[1], entrepreneurs etc.' (NKDA 2015a: 19). In the second version of the proposal, the description had changed to:

> *Respondents included – senior citizens, housewives, students, professionals including IT employees, informal sector workers, children, non-resident property owners, citizens seeking to relocate to New Town in near future, entrepreneurs, developers, businessmen, city administrators, elected representatives, academicians and other government institutions along with visitors to the city (Refer to Annexure 3.2.1 and 3.2.2 for details). (NKDA 2016a: 19)*

The details of the annexure include a visual representation of the citizens' 'focus groups' targeted in the consultation process, which included the poor and vulnerable people primarily in the fifth category of those employed in the 'informal sectors' (see Figure 5.2).

Figure 2: Citizens' Groups targeted in the Consultation Process



Source: NKDA 2016b: Citizen Engagement, 3.2.1 (Open source): https://smartnet.niua.org/sites/default/files/resources/annexures_kolkata.pdf

[1] Non-resident Indians: Indian citizens or people of Indian origin living abroad.

Our respondents provided some clarity on the question of 'who participated' during the consultations organised in the city. One respondent observed that a household comprising four to five family members including senior citizens, male and female professionals, children, housemaids, cooks, nannies and pets were generally represented by a single male senior member of the family. Women only attended the meetings when male members of their family could not attend, or because the male members considered the meetings to be 'childish endeavours' that were not worth attending. Another respondent described how a few enthusiastic (often retired) male residents, held in high esteem by local government officials due to their successful professional careers, were personally invited to the consultation sessions. Clearly, these influential people were not the marginalised, vulnerable citizens and slum dwellers that the national mission guidelines referred to.

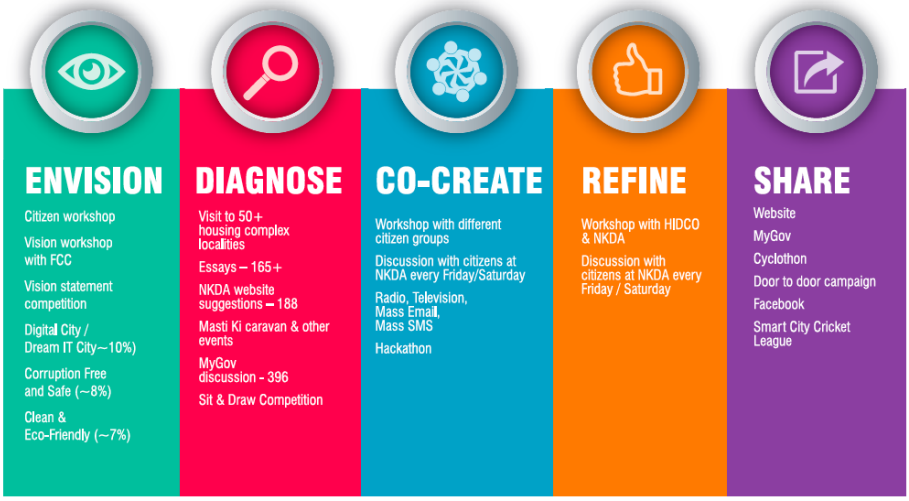
Each participating residential community, such as the residents' welfare association of a block of flats, selected a representative to attend the NKDA meetings and workshops. Before these participatory gatherings, some of these representatives collected ideas from other residents, or wrote up their own ideas and validated the same with other residents of the community. Recalling one such meeting, one of our respondents noted:

> *This was in April or May 2015. Representatives of the residents' welfare associations were asked to participate in a meeting at NKDA office. After an introductory speech by the chair of the NKDA, we were showed some video clips (of smart cities around the world). We were then asked to propose any ideas and opinions about making New Town a smart city*.

Through the introductory speech, and by showing a video of other smart cities at the beginning, the participatory meeting was framed by the concerns and goals of NKDA officials. (proponents of the smart city). Such a framing contributes to the closing down of the decision-making process (Stiring 2008). A powerful audio-visual medium like documentary-type videos risks reorienting the citizens' focus away from their local issues and concerns, towards aspirations for meeting 'global' standards (Gerbner 1987).

In contrast to the paucity of information on 'who participated', NTK's proposal and its annexures are replete with details about 'how citizens participated' in the consultation process. The proposal claims to have adopted a five-step methodology for citizen engagement, to 'envision', 'diagnose', 'co-create', 'refine' and 'share' (NKDA 2016b: 3.2.1). Figure 5.3 shows the different techniques that were used in each of these steps to engage with citizens.

Figure 3: Five-step Methodology for Citizen Engagement



Source: NKDA 2016b: Citizen Engagement, 3.2.1 (Open source):

https://smartnet.niua.org/sites/default/files/resources/annexures_kolkata.pdf

Several other forms and techniques for engaging with citizens are mentioned throughout the proposal and annexures. Following the proposal, in Table 5.1 we document the multiple citizen mechanisms used in the making of NTK's smart city imaginary, along with the number of citizens reached by each. Once again, the proposal does not provide details on what each of the mechanisms entailed.

Table1: Forums and Techniques Used for Citizen Engagement in 2015–2016

Mechanism	**Outreach**
Suggestions about smart initiatives received online	188
Online discussion about smart city vision	396
Online submission about smart city initiatives	577
Online registrations on MyGov app	20,000
Online votes on smart initiatives through the MyGov website	Not mentioned
Essays about a smart city and vision statements received	165
Emails	15,000 sent out
SMS	10,000 sent out, connecting 9,600+ households
Facebook	17,500+ followers; 150+ posts and comments; 2,500+ likes
Twitter	200 followers; 100+ tweets and retweets
YouTube	27 videos; 800+ views
WhatsApp social media group	Not mentioned
Dropbox facility	Not mentioned
NKDA website regularly updated	Not mentioned

Focus Group discussion and workshops for visioning and idea exchange camps	4,876 people attended
Two-day workshop conducted by Future Cities Catapult, UK and BuroHappold consulting, UK on 29 and 30 September 2015	Not mentioned
Offline polls (surveys with citizens) for smart solutions	1,000
Competition among citizens for the best smart city vision	Not mentioned
'Smart Fridays' organised at NKDA offices to facilitate discussions on vision/ goals and co-creating innovative solutions	Not mentioned
Offline votes on smart initiatives	55% from AA-I, 17% from AA-II, 4% from AA-III[2] and 24% from other areas
Survey with citizens	5,000 distributed, 314 received
Smart City Cycleathon: bicycle rally	1,200+ participants – extent of enthusiasm later cited as evidence that an appetite for cycling existed if adequate infrastructure is in place
Smart helpdesks and city-wide kiosks	7,193 offline suggestions received
'Masti ka Caravan' (Caravan of fun) – travelling to different residences, commercial areas and offices	Unknown
Sit and draw competition for children who were asked to come up with a vision of their 'dream city'	100+ participants
Smart city stalls during the Durga Puja festival	Unknown
Other events (with smart city kiosks for information dissemination and exchange), during the Durga Puja, Lakshmi Puja and Diwali festivals	138
Publication of an information brochure and citizen involvement procedure	Unknown
Radio programmes such as 'Innovative Fridays' – a talk show for eliciting innovative ideas from citizens held in cooperation with a local radio station to seek ideas, suggestions and opinions from citizens	Not mentioned
Distribution of flyers	'ensuring maximum exposure' (NKDA 2016a: 20)

Sources: NKDA (2015a); NKDA (2016a) NKDA (2015b); NKDA (2016b); mygov.in (2019)

Table 5.1 indicates that a wide variety of mechanisms were used for engaging with citizens. However, the majority of these efforts, such as the distribution of flyers, the sending out emails or WhatsApp messages, the help desks, the bicycle rally, and the regularly-updated website, were geared towards communicating *to* citizens and enthusing them about NTK's

[2] New Town Kolkata is divided primarily into three Action Areas (AAs), even though there are parts of New town Kolkata which are not covered within these three AAs.

smart city visions, rather than seeking ideas and initiatives from them, or imagining the smart city in collaboration with them. There is also a clear bias towards online media for citizen engagement. Such a focus on online media ends up excluding those (marginalised) citizens who do not own a smartphone, tablet or computer, or possess the skills to handle such a device. A few mechanisms did exist for citizens to give feedback, such as through the MyGov app and written submissions. Yet the majority of citizens were heard through face-to-face forums such as focus group discussions and workshops (NKDA 2016b: 3.2.2). However, NTK's smart city documents do not describe the design or practice of the discussions and workshops. Overall, there is a tendency to highlight the sheer quantity of participation and a lesser emphasis on the content and quality of it. As a result, it is also difficult to ascertain if marginalised citizens attended these gatherings at all, and if all those who attended were able to raise their voices and get heard.

Without two-way communication for the co-production of visions by citizens and city officials, participation is reduced largely to citizens' access to information provided by the governance institutions. Citizens were afforded limited opportunities to offer their divergent visions of the city's futures. As a result, the citizen engagement process in NTK was prone to closing down the imaginary, by marginalising dissenting voices and interests in all their messy diversity. The final proposal was kept largely within the bounds of technocratic smartness as imagined by urban planners/administrators and their partners in tech firms and consultancies. This is apparent in NTK's proposal and other related smart city government documents, in which the role of the firms and consultancies is made substantially more prominent than the role played by thousands of local citizens who were counted as participants (83 per cent of NTK's total population, according to the NKDA (2016a: 19)). Therefore, while citizen participation was counted as significant in sheer numbers of people engaged with, the actual impact of these divergent voices appears to have been somewhat limited, as we document in more detail below.

5.3 An 'Articulated' Smart City Imaginary?

Having an avenue to participate does not necessarily ensure that citizens actually *influence* the eventual imaginary articulated in NTK's proposal to the national Smart Cities Mission. Our conversations with NKDA officials revealed that the information gathered from citizens was reviewed, 'cleaned up', and some ideas were cherrypicked out of the received input. Thus, even though a wide range of ideas were received from participating citizens, NTK's policymakers and planners acted as gatekeepers. They not only framed the design and practice of citizen engagement mechanisms (as detailed in the previous section), but also controlled the flow of ideas. To enact this control, they accepted some ideas as relevant for the proposal, while summarily discarding others. Therefore, only a small selection from all the voices raised by citizens was articulated in/with NTK's Smart City Proposal.

The national Smart City Challenge specifies criteria to emphasise the inclusion (or articulation) of citizens' voices in Smart City Proposals. One such criterion asks: 'How well does the Vision come out of the needs, aspirations and wishes of the local people to make their city more liveable?' (MoUD 2015: 33). For this, the national mission guidelines call for the inclusion of 'details of process for co-creating every step (ideas, strategies, implementing mechanism and financial solutions) through an extensive consultation process' (MoUD 2015: 35). A further evaluation criterion asks: 'Do the goals flow from vision identified through citizen

consultation?' (MoUD 2015: 34). The guidelines also require cities to respond to whether 'best practices [have] been identified and selected in consultation with citizens?' (MoUD 2015: 35).

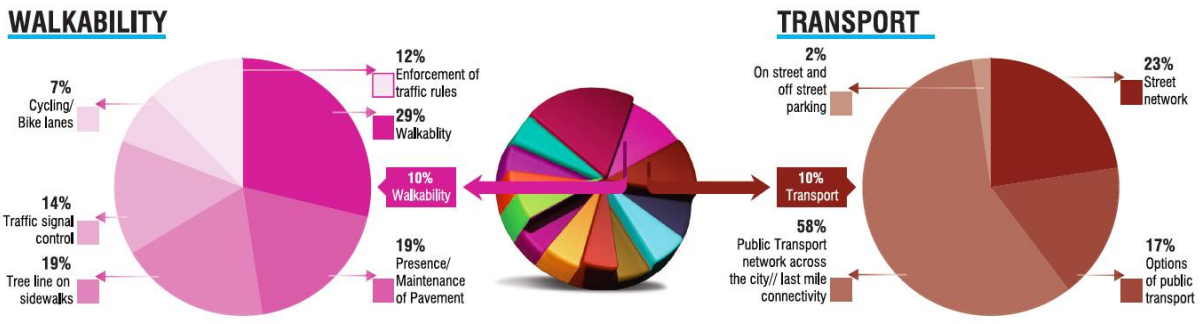
The first version of NTK's proposal does not respond to these criteria. It provides only a brief description of different citizen engagement methods (in a two-page section titled 'citizen engagement'). It does nevertheless claim that the smart city vision was collectively imagined, incorporating citizens' inputs. The content of the second revised proposal is more informative in describing the process of articulation of citizens' voices. An example of the latter is shown in Figure 5.4, which details citizen feedback on mobility. It appears that walkability (including cycling and enforcement of traffic rules) and transport (including parking facilities) each constituted ten per cent of the total citizen responses (NKDA 2016a: 48). Under transport, the citizens' emphasis is overwhelmingly on public transport, both concerning the expansion of options, pan-city connectivity and last-mile connectivity (between bus or metro stop and office or residence). How do these citizens' concerns align with the smart mobility initiatives and solutions proposed by NTK in its proposal?

The submitted version of the proposal included seven different mobility-related solutions (NKDA 2016a: 27):

- five smart bus stands and one smart bus terminus
- a carpooling programme
- a cycling project
- 145 km of pedestrian-friendly pathways and citizens' plaza (2,450 sq. m)
- nine smart parking lots
- an app for autorickshaws/ *Totos* (developed at pan-city level)
- 30 autorickshaw/ *Toto* stands with charging station, waiting area, water fountains and other amenities.

Besides, eight new metro stations and a 'multi-modal transport hub' in each metro station were proposed to 'create seamless transport connectivity across the public transport modes' (NKDA 2016b: 3.7.2). Other options such as monorail, sky trains and bike-sharing were also proposed. Many of the mobility initiatives proposed thus appear to be consistent with the citizens' emphasis (depicted in Figure 5.4).

Figure 4: Citizen Feedback on Mobility Issues in New Town, Kolkata's Smart City Proposal



Source: NKDA 2016b: Citizen Engagement, 3.2.2 (Open source): https://smartnet.niua.org/sites/default/files/resources/annexures_kolkata.pdf

In these proposed mobility initiatives, however, ICT is never far away. Mobility is imagined in terms of technologies such as the 'smart auto-toto app', 'bus locator', 'app for ride pooling', 'fare integration for e-buses' and 'smart bus stands with passenger information system' (NKDA 2016b: 3.7.2). From the proposal's articulation of citizen feedback (Figure 5.4), it is clear that the extensive use of ICT services in mobility was not a citizen concern. The ICT-based solutions are imagined by urban planners and other experts involved in defining the proposal, with no explicit reference to citizens' concerns. NKDA officials took pride in being able to offer the ICT-based smart solutions and admitted that these initiatives were aimed at presenting NTK as a 'world-class city' (Roy 2011: 259). As one of our respondents noted: 'if people in New York enjoy certain facilities, why would people in India not have those facilities?' This official adopts a 'global' aspiration to turn NTK into a city such as New York and, rather interestingly, attributes this aspiration not only to the residents of NTK but to the whole of India. Clearly, the smart sociotechnical imaginary of NTK is then not just local, designed in response to and in collaboration with the city's residents, or even national, in response to and in accordance with the mission guidelines. It is also global, inspired by other distant cities and standards. And, arguably, there is a trade-off between the transformations proposed in response to a notion of globality and those that are responsive to the needs and knowledge of the city's residents (Bose 2014). It seems that, rather than meeting the needs and knowledges of the city's residents, NTK officials reinterpreted the citizens' voices by attaching them to advanced ICT, following 'global' imaginaries with an aim to replicate smart developments in 'richer and more developed' cities such as New York or London (Wiig and Wyly 2016: 488).

The revised version of the proposal contains a critical annexure titled 'Model "Liveable" Neighbourhood', which attempts to articulate the needs and challenges of living in the city, voiced by three anonymised NTK citizens (NKDA 2016b: 3.6.5). For this, following the suggestion of the UK-based consultancy, Future Cities Catapult, NTK officials selected one young woman (aged 27, who recently moved back to India after living abroad for some time), one middle-aged man (aged 55, working in a private firm) and a senior citizen (male, aged 74, retired, middle class). The woman's concerns focus on the lack of walking and cycling infrastructure, poor air quality and lack of safety in the neighbourhoods. The middle-aged man is concerned about access to doctors, health facilities and the market for food etc., while the senior citizen emphasises the need for last-mile connectivity using para-transit modes and public spaces for community gatherings (NKDA 2016b: 3.6.5). Transport and mobility are central to all three citizens' concerns. While the articulation of the three citizens' concerns is usefully illustrative of citizens' voices, the proposal does not describe why these citizens were selected and how representative their articulations were of the concerns of poor and vulnerable men and women living and working in NTK. Instead, this exercise appears to have helped the ticking of a box titled 'model livable [*sic*] neighbourhoods' in the proposal preparation guidelines provided by the national government (NKDA 2016a: 90).

At first sight, it appears that NTK's proposal contains smart solutions that respond to each of the three citizens' needs and challenges. For instance, the proposal promises that '100% streets [will be] having grade-separated bicycle track and unobstructed footpath', in alignment with the young woman's concerns (NKDA 2016b: 3.6.5). For the purposes of

understanding the process of articulation in the development of NTK's smart city, two observations are essential. First, the consultation process was focussed on gathering citizens' concerns regarding their perceived needs and challenges of living in NTK, rather than any innovative solutions and initiatives based on their knowledge and experience. The initiatives and solutions are instead imagined by urban planners and policymakers, advised by hired consultants and tech firms, which are ostensibly based on the concerns voiced by citizens. Second, considering that the three citizens' voices were only articulated in the revised version of the proposal, it is likely that the solutions proposed by the urban planners and policymakers were not responses to citizens' concerns at all. Instead, the latter concerns may have been selected, filtered out of a diversity of citizen inputs (see above), to include in the proposal because they were consistent with the technological solutions that the planners and policymakers had already defined and incorporated into the smart city imaginary. Thus, it was technological solutionism that dominated the smart city imaginary, even when it came to the articulation of citizens' concerns and feedback.

To map some of the voices that did not get articulated in the proposal, we requested our respondents to narrate their concerns and solutions (focussing on transport and mobility), which they had raised earlier during face-to-face consultations with city officials and their consultants. The citizens' concerns and solutions included general issues such as traffic congestion, improvements to city roads, good public transport and communication. They also added some concrete suggestions such as escalator and lift services in metro stations, safe, well-lit, clean underpasses for walking and crossing the roads, direct bus connectivity to all parts of central Kolkata, as well as higher frequency and more reliable public bus services. These concerns and solutions show that smart urban mobility is not necessarily ICT-driven or even high-tech. Citizens instead emphasise the reliability, accessibility and convenience of using public transport.

Our respondents, in this case mostly middle-class citizens, proudly noted that the chair of the NKDA readily accepted their proposals in the consultation meeting that they attended. Officials at the NKDA also claimed that citizens' viewpoints in many cases helped them to reframe their strategies. As one official noted, 'normally we wouldn't have given priority to walkability, but citizens' feedback showed us [other] directions to allocate our limited budget'. This indicates that the policymakers and planners were open to at least some alternatives highlighted by upper- and middle-class citizens. Other officials clarified that citizens' voices mattered, but only when they 'made sense' from the perspective of financial feasibility and wider social concerns. As observed by a city official: 'Often citizens' concern is their immediate neighbourhood; they would hardly ever reflect on an overall aggregate strategic planning. If you listen too much to citizens' views, you go nowhere. You need to take control and do strategic planning'. Such disdain towards and forced localisation of citizens' concerns does not bode well for the articulation of divergent and dissenting voices in the smart city imaginary. It could be due to such disdain that the final version of the proposal included only those citizens' voices and the data/graphs on citizens' feedback that were in alignment with the technological solutions and initiatives considered smart by NTK officials and their consultants.

Ultimately, the citizens whose voices are articulated in NTK's smart city documents belong to the middle- and higher-income groups. They may be employed in (or retired from) prestigious government jobs, own a flat in one of the expensive gated communities, and/or possess

connections with (international) businesses. Voices of poor and marginalised people are therefore absent in the imaginary. This absence must be viewed as social exclusion of such voices because a participatory focus group consultation did target 'informal sectors: maids, construction workers, informal vendors' (NKDA 2016b: 3.2.1). Unfortunately, the voices raised in this particular consultation were not included or responded to in the formulation of solutions based on citizens' feedback. The concerns raised by members of this marginalised focus group are therefore not made explicit in the smart city imaginary. Nor is it clear why the marginalised citizens' concerns did not elicit a response from policymakers and planners, even when the 'informal vendors' were made targets of the smart solution of 'organised vending zones for 600 informal vendors' (NKDA 2016a: 43). Clearly, this solution, which might actually disadvantage the vendors, was not designed through consultations with them.

6 Discussion and Conclusions

We have attempted to address if New Town, Kolkata's smart city imaginary can be considered democratically transformative. We consider the latter to be constituted by three aspects: a) distributed, if the imaginary's envisioned distribution of benefits promotes equality among all citizens; b) participatory, if (in its making) it affords the citizens possibilities to engage in the process and raise their voices; and c) articulated, if it registers the (divergent) voices of the most marginalised and, as a result, modifies the official initiatives. Based on a discourse analysis of two versions of NTK's Smart City Proposal, in relation to the national mission guidelines, we discussed if and how the process of constructing the imaginary opened up to include a wide diversity of voices (*cf*. Stirling 2008) as well as a broader range of possibilities for 'smart' sociotechnical developments in the city.

We find that, following the national mission guidelines, the city-level authorities invested considerable effort in organising forums and techniques for citizens to engage with the construction of the imaginary. However, the process was inadequately participatory because a) the design and practice of forums/techniques was framed by the officials, in accordance with the technocratic and globalising teleology of smart cities; b) many of the forums/techniques were geared towards one-way flow of information from the city administration to the citizens; c) people who were invited to participate were mostly influential citizens rather than marginalised ones; d) emphasis was placed on counting the number of people attending rather than on the content of participation; and e) when citizen feedback was received, it was focussed on the identification of needs and challenges faced by the citizens rather than on mobilising their knowledge and existing innovative initiatives. While citizen-led unpacking of problems has real potential for democratising city planning (Calzada 2018), in reality, little space was afforded for actual co-production of the imaginary by citizens and planners/policymakers. Nor were most citizens afforded possibilities to challenge the content of the smart city imaginary.

Having said this, some citizens' voices appear to have been articulated in the proposal, and consistent with these voices, alternate smart solutions and initiatives seem to have been proposed, such as the emphases on walkability and cycling. However, it appears that many citizens' concerns and solutions, focussed on mobility and transport, that were translated into the proposal, were tied to ICT-based technological interventions in the transportation system.

This technological solutionism appears to have provided the basis for officials' selection and translation of particular citizens' concerns, out of the wide range of citizen inputs that were received. Many concerns of the citizens, as narrated by our respondents during the interviews conducted for this paper, were not articulated in the eventual imaginary.

Thus, we conclude that there was a propensity to close down the messy diversity of citizens' voices in the making of New Town, Kolkata's smart city imaginary despite its emphatic celebration of citizen engagement (possibly in response to the emphasis placed on the latter in the national smart city mission guidelines). To some extent, particularly in the second revised version of the city's proposal, a few citizens' voices were articulated and responded to (through the inclusion of new initiatives in the smart city imaginary). Unfortunately, however, this opening up to citizens' voices was restricted to people belonging to the upper and middle classes, and particularly those voices that were largely aligned with the city administration's technology-centred visions. Divergent and dissenting voices, particularly those of poor and marginalised people, were excluded from the imaginary, as were any changes in the direction of smart city developments based on those voices.

The inclusion of voices of the marginalised and their preferred directions of urban development is central to achieving democratically transformative smart city imaginaries. Expected benefits from such transformative imaginaries may be more widely distributed across different sections of the city. Such a transformative imaginary would serve the divergent needs of diverse citizens' groups, through a heterogeneous and plural set of sociotechnical options for smart city development. Unfortunately, in New Town, Kolkata, the expected benefits of the ICT-focussed smart city are concentrated among upper- and middle-class residents. The interests of the low-income population of the city, including a wide range of people who live or work as maids, 'informal' vendors and construction workers, remained marginal to the smart city imaginary.

We are not the first researchers to emphasise the marginalisation and exclusion of poor people's interests from smart city developments (e.g., see Benedikt 2016; Bhatkal *et al.* 2015; Datta 2015; Watson 2014). Nor is ours the first analysis of citizen engagement in the construction of smart city visions (see, for example, Cardullo and Kitchin 2017; Araya 2015). The novelty of our analysis lies in: a) its combination of the envisioned distribution of benefits with the articulation of diverse voices in the smart city imaginary; b) its development of a framework that rethinks smart in normative terms, as democratically transformative; and c) its mapping and assessment of the multiple participatory forums/techniques used in the construction of an ostensibly people-centred and socially inclusive smart city imaginary. Crucially, the concepts we have developed in the foregoing – distributed, participatory and articulated – can be used to examine how transformative are visions of other sociotechnical imaginaries, including those for green and sustainable cities.

Our framework is not without its shortcomings, however, which could be addressed in future research on sociotechnical imaginaries of the smart city. First, the framework does not adequately account for (marginalised) citizens' agency in imagining and building distributed, participatory and articulated smart cities. Such agency goes beyond invited participation in citizen engagement forums, organised by city officials. It is instead present in citizens' mobilisations (through social movements) for the democratisation of urban developments. It also manifests in citizens' collective initiatives and creative practices that make urban

livelihoods possible for the poor and marginalised (Kundu 2016; Saunders and Baeck 2015). Second, our framework does not adequately map how different forms of citizenship, including citizens' subjectivities as individualised consumers or as socially committed collectives, are constituted of (and shaped by) smart city imaginaries (see e.g., de Waal and Dignum 2017; Taylor *et al.* 2016).

Ultimately, we hope our framework is useful for appreciating how sociotechnical developments towards smartness or sustainability can be partial and exclusive, in highly unequal urban worlds. The latter makes it imperative that as citizens, we continue to demand and co-produce truly democratic imaginaries and realities, constituted by equally distributed benefits, participation by a diverse range of citizens and the articulation of the voices of the most marginalised. Now more than ever, marketised urban transformations attempt to imagine and portray citizens as individualised neoliberal consumers (as also documented above for Kolkata). Poor and marginalised citizens do not readily fit this vision (Martin *et al.* 2018). Nor are their voices often strong enough to challenge public-private partnerships dominated by the interests of big corporations promoting their technologies and services. The democratic burden, therefore, is on planners, policymakers and organisations working on participatory engagement, as well as citizens' movements, to challenge the partiality and exclusivity of urban sociotechnical imaginaries, by making central the voices and interests of the most marginalised citizens, and co-produce imaginaries that are democratically transformative.

References

Araya, D. (2015) 'Smart Cities and the Network Society: Toward Commons-Driven Governance' chapter 1 in D. Araya (ed) *Smart Cities as Democratic Ecologies*, London: Palgrave Macmillan

Arnstein, S. R. (1969) 'A Ladder of Citizen Participation', *Journal of the American Institute of Planners* 35(4): 216–24

Arora, S. (2016) 'Rethinking "Smart" in India: The City as an Ecology of Practices', *STEPS Centre Blog*, 5 February, http://steps-centre.org/2016/blog/rethinking-smart-in-india-the-city-as-an-ecology-of-practices/

Bakıcı, T., Almirall, E. and Wareham, J. (2013) 'A Smart City Initiative: The Case of Barcelona', *Journal of the Knowledge Economy* 4(2): 135–48

Benedikt, O. (2016) 'The Valuable Citizens of Smart Cities: The Case of Songdo City', *Graduate Journal of Social Science* 12(1): 17–36

Bertorelli, E., Heller, P., Swaminathan, S. and Varshney, A. (2017) 'Does Citizenship Abate Class?', *Economic & Political Weekly* 52(32): 47

Bhatkal, T., Avis, W. and Nicolai, S. (2015) *Towards a Better Life? A Cautionary Tale of Progress in Ahmedabad*, ODI Development Progress Case Studies, London: Overseas Development Institute

Bose, P. S. (2014) 'Living the Way the World Does: Global Indians in the Remaking of Kolkata', *Annals of the American Association of Geographers* 104.2: 391–400

Burri, R.V. (2015) 'Imaginaries of Science and Society: Framing Nanotechnology Governance in Germany and the United States' chapter 11 in S. Jasanoff and S. Kim (eds) *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, Chicago: University of Chicago Press

Callon, M., Lascoumes, P. and Barthe, Y. (2009) *Acting in an Uncertain World: An Essay on Technical Democracy*, Cambridge, MA: The MIT Press

Calzada, I. (2018) '(Smart) Citizens from Data Providers to Decision-Makers? The Case Study of Barcelona', *Sustainability* 10.9: 3252

Capdevila, I. and Zarlenga, M.I. (2015) 'Smart City or Smart Citizens? The Barcelona Case', *Journal of Strategy and Management* 8.3: 266–82

Caragliu, A., Del Bo, C. and Nijkamp, P. (2011) 'Smart Cities in Europe', *Journal of Urban Technology* 18(2): 65–82

Cardullo, P. and Kitchin, R. (2017) *Being a 'Citizen' in the Smart City: Up and Down the Scaffold of Smart Citizen Participation*, The Programmable City Working Paper 30, Maynooth: National Institute for Regional and Spatial Analysis

Carvalho, L. (2014) 'Smart Cities from Scratch? A Socio-technical Perspective', *Cambridge Journal of Regions, Economy and Society* 8(1): 43–60

Corsini, F., Certomà, C., Dyer, M. and Frey, M. (2018) 'Participatory Energy: Research, Imaginaries and Practices on People Contribute to Energy Systems in the Smart City', *Technological Forecasting and Social Change* 142: 322-32

Datta, A. (2015) 'New Urban Utopias of Postcolonial India: "Entrepreneurial Urbanization" in Dholera Smart City, Gujarat', *Dialogues in Human Geography* 5(1): 3–22

Davies, G. (2006) 'Mapping Deliberation: Calculation, Articulation and Intervention in the Politics of Organ Transplantation', *Economy and Society* 35(2): 232–58

de Hoop, E. and Arora, S. (2017) *Policy Democracy: Social and Material Participation in Biodiesel Policy-making Processes in India*, SPRU Working Paper Series 2017–02, Brighton: SPRU

de Waal, M. and Dignum, M. (2017) 'The Citizen in the Smart City: How the Smart City Could Transform Citizenship', *Information Technology* 59(6): 263–73

Docherty, I., Marsden, G. and Anable, J. (2017) 'The Governance of Smart Mobility', *Transportation Research Part A: Policy and Practice* 115: 114-25

Falconer G. and Mitchell S. (2012) *Smart City Framework*, CISCO IBSG (Internet Business Solutions Group), www.cisco.com/c/dam/en_us/about/ac79/docs/ps/motm/Smart-City-Framework.pdf (accessed 2 July 2019)

Ferro, E., Caroleo, B., Leo, M., Osella, M. and Pautasso, E. (2013) 'The Role of ICT in Smart Cities Governance', Proceedings of 13th International Conference for E-democracy and Open Government, Donau-Universität Krems, 133–45

Gerbner, G. (1987) 'Science on Television: How it Affects Public Conceptions', *Issues in Science and Technology* 3(3): 109–15

Giffinger, R. and Gudrun, H. (2010) 'Smart Cities Ranking: An Effective Instrument for the Positioning of the Cities?', *ACE: Architecture, City and Environment* 4(12): 7–26

HIDCO (1999) 'New Town Calcutta Project Report for AA-I', mimeo, New Town, Kolkata: Housing Infrastructure Development Corporation

Hochadel, A. (2016) 'India's 100 Smart Cities - What Will Success Look Like?', *Future Cities Catapult*, blog, 28 January, http://futurecities.catapult.org.uk/2016/01/28/blog-indias-100-smart-cities-what-will-success-look-like (accessed 10 March 2018)

Hollands, R.G. (2008) 'Will the Real Smart City Please Stand Up? Intelligent, Progressive or Entrepreneurial?', *City* 12(3): 303–20

Hollands, R. G. (2015). Critical interventions into the corporate smart city. *Cambridge Journal of Regions, Economy and Society*, *8*(1), 61–77.

Irungbam, R.S. (2016) 'The Model of Smart Cities in Theory and in Practice', *Journal for Studies in Management and Planning* 2(4): 156–187

Jasanoff, S. (2004) 'Ordering Knowledge, Ordering Society', chapter 2 in S. Jasanoff (ed) *States of Knowledge: The Co-production of Science and Social Order*, London: Routledge

Jasanoff, S. and Kim, S-H. (eds) (2015) *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, Chicago: University of Chicago Press

Jasanoff, S. and Kim, S-H. (2009) 'Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea', *Minerva* 47.2: 119–46

Khanna, A. and Khanna, P. (2015) 'Generative Cities: Innovative, Sustainable, Inclusive', chapter 3 in D. Araya (ed) *Smart Cities as Democratic Ecologies,* London: Palgrave Macmillan

Kitchin, R. (2014) 'The Real-time City? Big Data and Smart Urbanism', *GeoJournal* 79(1): 1–14

Kruks-Wisner, G. (2018) 'The Pursuit of Social Welfare: Citizen Claim-Making in Rural India', *World Politics* 70(1):122-63, doi: https://doi.org/10.1017/S0043887117000193 (accessed 2 July 2019)

Kundu, R. (2016) 'Making Sense of Place in Rajarhat New Town', *Economic & Political Weekly* 51(17): 93

Lazaroiu, G.C. and Roscia, M. (2012) 'Definition Methodology for the Smart Cities Model', *Energy* 47(1): 326–32

Luque, A., McFarlane, C. and Marvin, S. (2014) 'Smart Urbanism: Cities, Grids and Alternatives', chapter 6 in M. Hodson and S. Marvin (eds) *After Sustainable Cities*, London: Routledge

Martin, C.J., Evans, J. and Karvonen, A. (2018) 'Smart and Sustainable? Five Tensions in the Visions and Practices of the Smart-sustainable City in Europe and North America', *Technological Forecasting and Social Change* 133: 269–78

Menon, A. (2015) 'Urban Planning - Smart Cities Are the Way Ahead for Us', *The Times of India* http://epaperbeta.timesofindia.com/Article.aspx?eid=31804&articlexml=URBAN-PLANNING-Smart-Cities-are-the-way-ahead-26012015014030
(accessed 29 June 2018)

Midgley, P. (2009) 'The role of Smart Bike-sharing Systems in Urban Mobility', *Journeys* 2(1): 23–31

MOHUA (2017) 'Smart Cities', Ministry of Housing and Urban Affairs, Government of India, http://mohua.gov.in/cms/smart-cities.php (accessed 8 March 2018)

MoUD (2015) *Smart Cities: Mission Statement and Guidelines*, New Delhi: Ministry of Urban Development, Government of India

MoUD (2016) New Town-Kolkata SCP Observations https://www.nkdamar.org/File/New-Town-Kolkata.pdf (accessed 20 July 2019)

Muggah, R. (2014) 'Deconstructing the Fragile City: Exploring Insecurity, Violence and Resilience', *Environment and Urbanization* 26(2): 345-58

MyGov (2019) *Smart city New Town Kolkata* https://secure.mygov.in/group-issue/smart-city-new-town-kolkata/ (accessed 30 July 2019)

Nam, T., and Pardo, T. A. (2011) 'Conceptualizing Smart City with Dimensions of Technology, People, and Institutions', Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times, ACM, 282–91

Neirotti, P., De Marco, A., Cagliano, A.C., Mangano, G. and Scorrano, F. (2014) 'Current Trends in Smart City Initiatives: Some Stylised Facts', *Cities* 38: 25–36

NKDA (2016a) *New Town Kolkata Smart City Proposal (upgraded),* Smart City Challenge Stage 2, India Smart City Mission, Kolkata: New Town Kolkata Development Authority

NKDA (2016b) *New Town Kolkata Smart City Proposal (upgraded), Annexures*, Smart City Challenge Stage 2, India Smart City Mission, Kolkata: New Town Kolkata Development Authority

NKDA (2016c) *Background*, New Town Kolkata Development Authority, https://www.nkdamar.org/Pages/Background.aspx (accessed 8 March 2018)

NKDA (2015a) *New Town Kolkata Smart City Proposal*, Smart City Challenge Stage 2, India Smart City Mission, Kolkata: New Town Kolkata Development Authority

NKDA (2015b) *New Town Kolkata Smart City Proposal, Annexures*, Smart City Challenge Stage 2, India Smart City Mission, Kolkata: New Town Kolkata Development Authority

Owen, H. (2008) *Open Space Technology: A User's Guide* (3rd edition), San Francisco: Berrett-Koehler Publishers

Paquet, J., Vikhornova, A., and Wright, N. (2016) *Sharing Cities: D2.1C Report on Engagement Methods*, London: Future Cities Catapult

Pimbert M.P. and Wakeford T. (2002) *Prajateerpu: A Citizens Jury/Scenario Workshop on Food and Farming Futures for Andhra Pradesh, India*, London: International Institute for Environment and Development and Brighton: IDS

Ponting, A. (2013) 'High-Tech Urbanism: The Political and Economic Implications of the Smart City', Program of Urban Studies, Stanford University

Praharaj, S., Han, J.H. and Hawken, S. (2018) 'Urban Innovation Through Policy Integration: Critical Perspectives from 100 Smart Cities Mission in India', *City, Culture and Society* 12: 35–43

Roy, A. (2011) 'The Blockade of the World-Class City: Dialectical Images of Indian Urbanism', chapter 10 in A. Roy and A. Ong (eds) *Worlding Cities: Asian Experiments and the Art of Being Global*, First Edition, Oxford: Blackwell Publishing Limited

Sadowski J. and Pasquale F. A. (2015) 'The Spectrum of Control: A Social Theory of the Smart City', *First Monday* 20.7, https://firstmonday.org/article/view/5903/4660 (accessed 2 July 2019)

Saunders, T. and Baeck, P. (2015) *Rethinking Smart Cities from the Ground Up,* London: Nesta

Sengupta, U. (2013) 'Inclusive Development? A State-led Land Development Model in New Town, Kolkata', *Environment and Planning C: Government and Policy*, 31(2): 357–76

Stirling, A. (2008) '"Opening Up" and "Closing Down": Power, Participation, and Pluralism in the Social Appraisal of Technology', *Science, Technology and Human Values* 33(2): 262-94

Stirling, A., Leach, M., Mehta, L., Scoones, I., Smith, A., Stagl, S. and Thompson, J. (2007) *Empowering Designs: Towards More Progressive Appraisal of Sustainability*, STEPS Working Paper 3, Brighton: STEPS Centre

Taylor, L., Richter, C., Jameson, S. and Perez del Pulgar, C. (2016) *Customers, Users or Citizens? Inclusion, Spatial Data and Governance in the Smart City*, Maps4Society Final Project Report, http://ssrn.com/abstract=2792565 (accessed 2 July 2019)

Townsend, A.M. (2013) *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*, New York: W. W. Norton & Company Inc.

Trencher, G. (2018) 'Towards the Smart City 2.0: Empirical Evidence of Using Smartness as a Tool for Tackling Social Challenges', *Technological Forecasting and Social Change* 142(C): 117–28

Vallentyne, P. (2007) 'Distributive Justice', chapter 28 in R. E. Goodin, P. Petit and T. Pogge (eds) *A Companion to Contemporary Political Philosophy*, Malden, MA: Blackwell Publishing Ltd., http://hdl.handle.net/10355/10157

van der Graaf, S. and Ballon, P. (2018) 'Navigating Platform Urbanism', *Technological Forecasting and Social Change* 142(C): 364–72

Vanolo, A. (2013) 'Smartmentality: The Smart City as Disciplinary Strategy', *Urban Studies* 51(5): 883–98

Watson V. (2014) ‘African Urban Fantasies: Dreams or Nightmares?’, *Environment and Urbanization* 26: 215–31

Wiig A. and Wyly E. (2016) ‘Thinking Through the Politics of the Smart City’, *Urban Geography* 37.4: 485–93

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Smart as Democratically Transformative? An Analysis of 'Smart City' Sociotechnical Imaginary in India

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'Smart cities' as sociotechnical imaginaries have been enthusiastically embraced by urban planners and policymakers around the world. In 2014, the government of India launched its Smart Cities Mission ostensibly to create socially inclusive and sustainable cities. Aspiring to make their cities smart, and following guidelines provided by the national government, urban authorities from all corners of India submitted proposals to compete in a Smart City Challenge. If successful, they would receive financial and technical support from the national government, to carry out the proposed smart transformations.

Focussing on the urban mobility aspects of one such proposal, submitted by New Town, Kolkata, we assess how democratically transformative was the collective process of imagining smart cities in India. A democratically transformative process not only imagines the benefits of smart transformations to be widely distributed across different sections of the city, but it is also participatory and articulated. A participatory process affords possibilities to the most marginalised citizens to engage and raise their diverging and dissenting voices. And an articulated process registers the voices of the most marginalised in the sociotechnical imaginary it produces. Our results indicate that while considerable efforts were made to engage with citizens in the making of the imaginary, the process remained highly uneven and technology-centric, shaped by 'globalised' aspirations of urban smartness and by the upper and middle classes, leaving behind the voices and needs of poor and marginalised citizens of Kolkata.